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ABSTRACT

MS and Neurotrauma: Meta Analysis

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Background: Multiple sclerosis (MS) is a chronic neurodegenerative disease characterized by the degeneration of myelin sheaths and activation of astrocytes and microglia. Recent studies suggest a potential link between neurotrauma, particularly head injuries, and MS development.

Objective: This study aims to systematically evaluate the relationship between neurotrauma and the onset of MS, focusing on how head injuries may influence the development of the disease.

Methods: A systematic review and meta-analysis were conducted following PRISMA guidelines. A comprehensive search of PubMed, Cochrane Library, and Google Scholar was performed using relevant MeSH terms and keywords. Studies were included if they reported on the history of neurotrauma among individuals with MS or the onset of MS in those with neurotrauma. Ten studies involving 513,195 participants were included. Statistical analyses, including pooled odds ratios (OR), heterogeneity, and publication bias, were conducted using Cochrane's Review Manager.

Results: The meta-analysis revealed a statistically significant association between neurotrauma and MS, with a pooled odds ratio of 1.34 (95% CI: 1.06 to 1.71, $p < 0.002$). This indicates that individuals with a history of neurotrauma are 34% more likely to develop MS compared to those



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without such a history. Significant heterogeneity ($I^2 = 83\%$) and indications of publication bias were observed.

Conclusion: Neurotrauma is associated with an increased likelihood of developing MS, suggesting that head injuries may act as an environmental trigger for the disease. Further research is needed to explore the mechanisms underlying this relationship.

Keywords: multiple sclerosis; Traumatic Brain Injury; Neuroinflammation; Systematic Review; Meta-Analysis

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